Technical Analysis of the “Trim Line”

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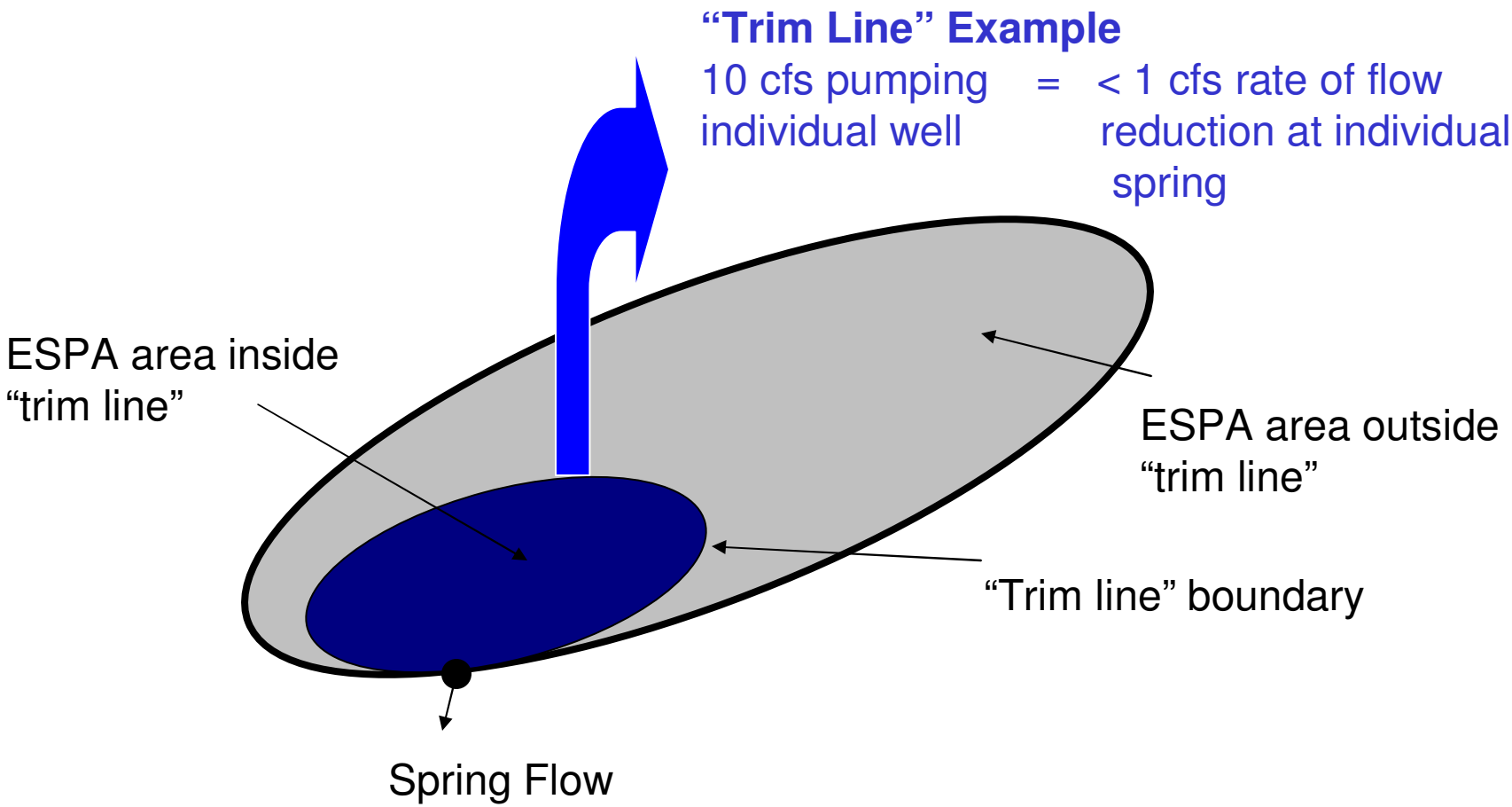
Outline

- What is the “trim line”?
- What is model uncertainty? Is the “trim line” a function of model uncertainty?
- How has the trim line been used to evaluate the impacts of junior-priority ground water pumping on spring flow reaches? Is it technically justified?
- If we are going to use a “trim line”- what should it try to accomplish?

What is the “Trim Line”?

- Area of ESPA where ground water pumping will deplete flow at spring reaches by less than 10 percent of total consumptive use. Determined by ESPAM.
  - Example: Ground water pumping (consumptive use) of 10 cfs outside the trim line would deplete flow at the spring reaches by less than 1 cfs.
- “Trim line” also includes a clip to the WD 130 boundary.

What is the “Trim Line”?



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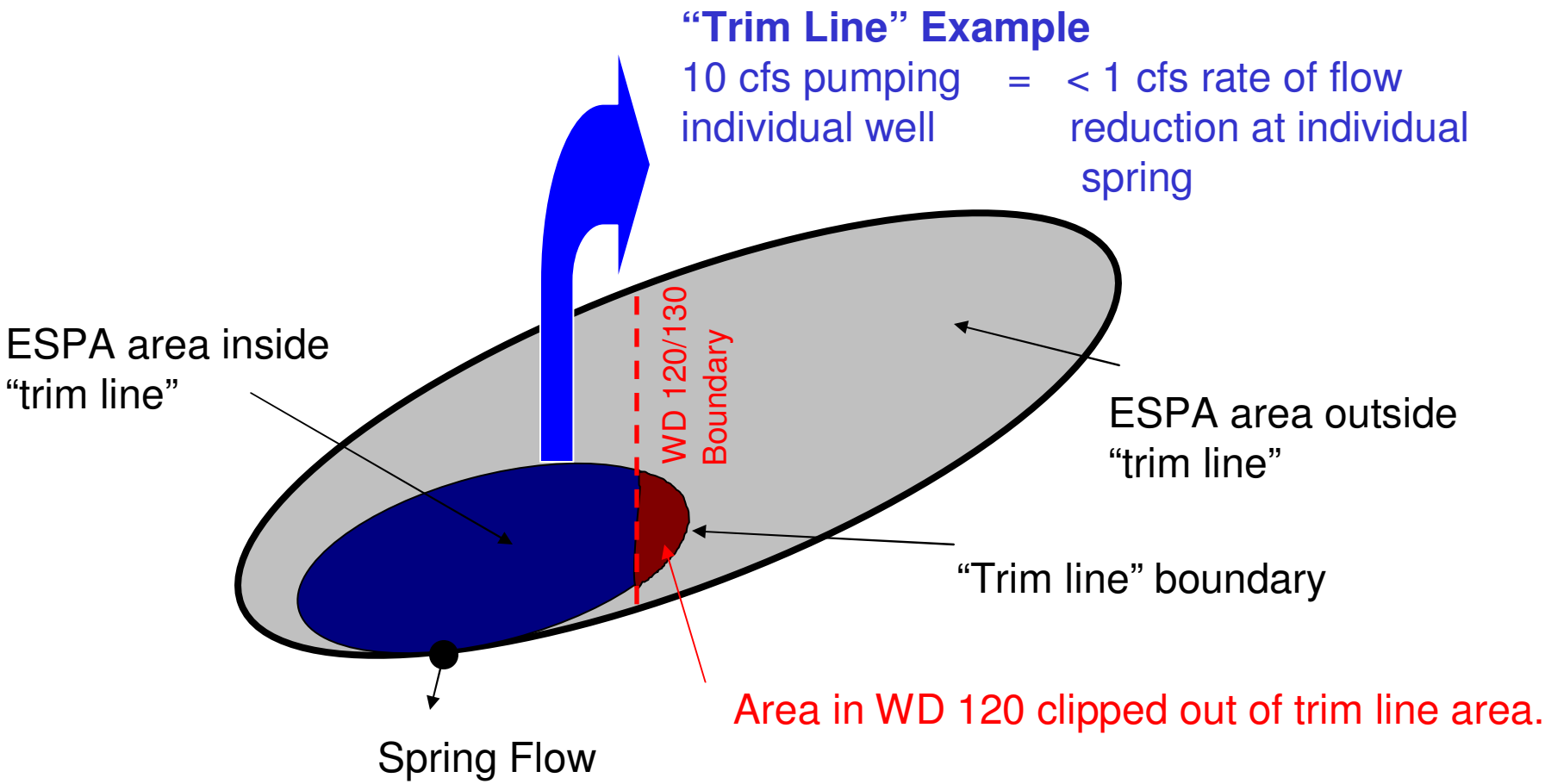
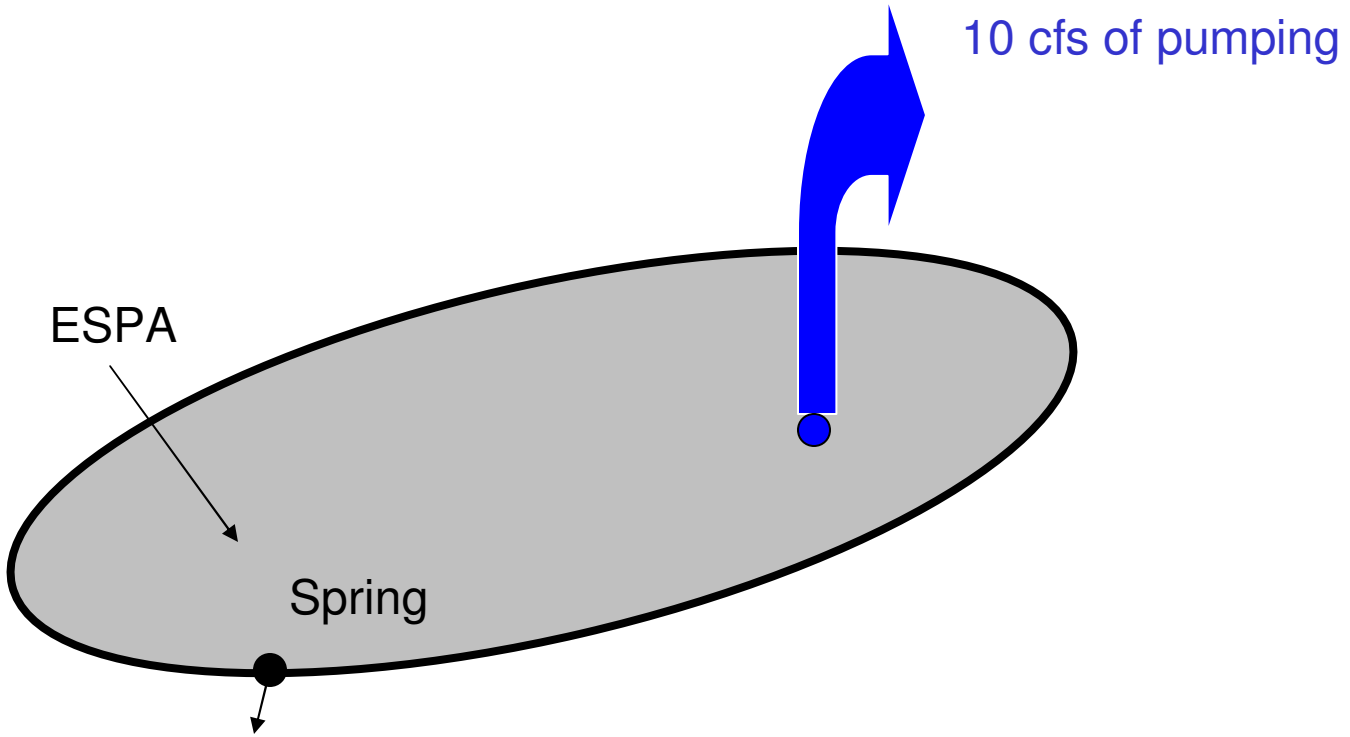


Incorrect Assumption that Uncertainty in Calibration Targets Justifies "Trim Line"

- Model calibration target uncertainty assumed at 10%. The 10% trim line is tied to model target uncertainty.
- Uncertainty in model calibration targets:
  - Ground water levels (± 0.1 to 1 ft, <1% accuracy, *hundreds of transient targets*)
  - Spring flow (varies, ± 2 to 5% as high as 10% depending on measuring device- weir, flow meter in canal, ~*9 transient targets*)
  - River reach gains (varies, ± 5 to 10 percent or greater, ~*5 transient targets*)
- No reasonable justification to assume that the model calibration target accuracy is limited to river gage accuracy or that it is 10 percent. Trim line has nothing to do with model uncertainty.

How could you calculate the impacts of an individual well pumping on a spring with a 10% model uncertainty?



1 cfs of spring flow reduction

10% model uncertainty = ± 10% at or 0.1 cfs

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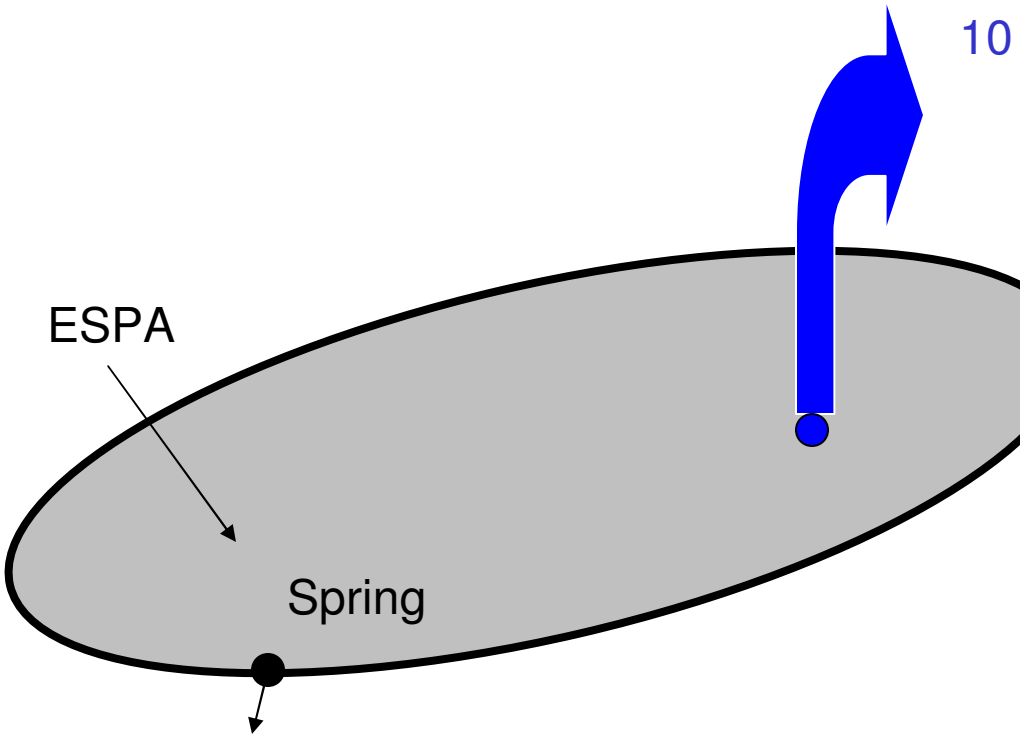

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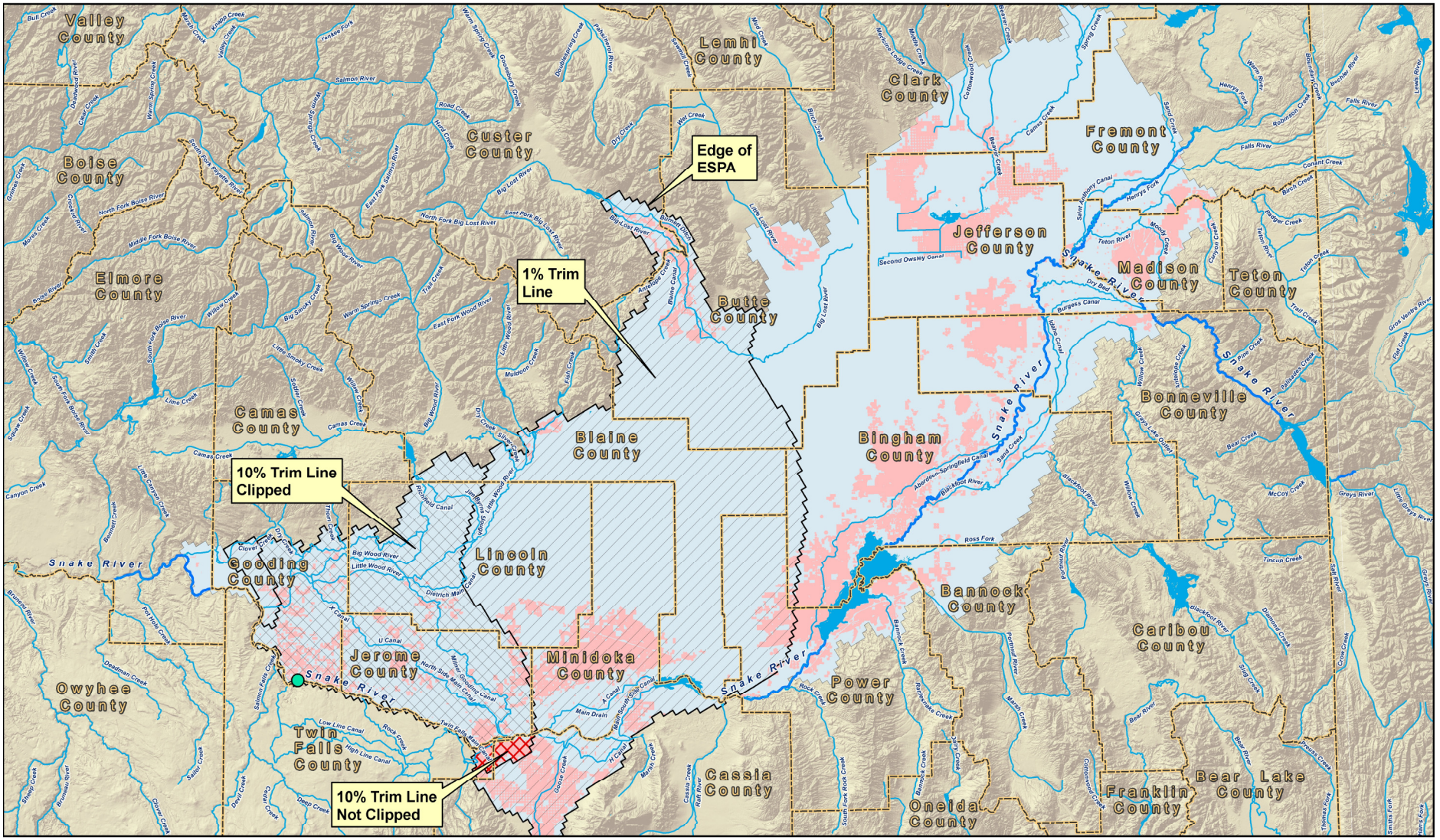
- There is no determination of biased model results for ESPAM.
- Therefore, the model uncertainty is plus ***or*** minus.
- The model uncertainty should not be used as a justification to reduce the determination of impacts by ground water pumping.

Location of Buhl-Thousand Springs Reach "Trim Line"



Legend

- Clear Springs Farms, Surface Water Diversion Point
- Ground Water Pumping Areas
- No Trim Line (All of ESPA)
- 10% Trim Line Clipped to WD 130 (More than 10% Depletion by Individual Wells on Buhl to 1000 Springs Reach)
- 10% Trim Line Not Clipped to WD 130 (More than 10% Depletion by Individual Wells on Buhl to 1000 Springs Reach)
- 1% Trim Line (More than 1% Depletion by Individual Wells on Buhl to 1000 Springs Reach)

0 10 20 30 Miles

Aquifer Area Using
Buhl-Thousand Springs Reach "Trim Line"

	Groundwater Irrigated Area (acres)	# of Model Cells	Groundwater Consumptive Use (ac-ft)
September 15, 1955 Priority			
All Rights Junior to 1955	717,428	4,070	1,434,570
1% trim line	288,577	1,797	632,033
10% trim line, *not* clipped to WD130	85,059	649	202,375
10% trim line, clipped to WD130 (IDWR trim line)	75,509	614	181,328

Results of Buhl-Thousand Springs Reach "Trim Line"

September 15, 1955 Priority		
Scenario	**Modeled Buhl to Thousand Springs Reach Gain (cfs)**	**Assuming 6.9% of Flow in Buhl to Thousand Springs Reach as in Order (cfs)**
All rights junior to 1955	98.22	6.78
1% trim line	94.08	6.49
10% trim line *not* clipped to WD130	56.32	3.89
10% trim line clipped to WD130 (IDWR trim line)	53.27	3.68

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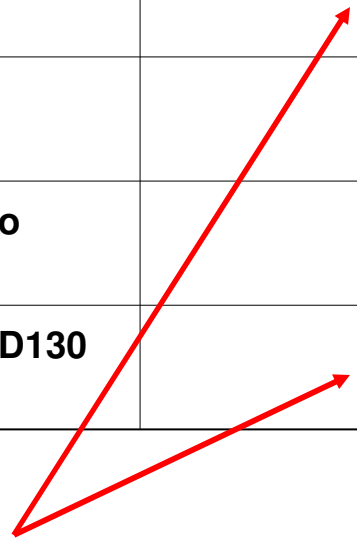
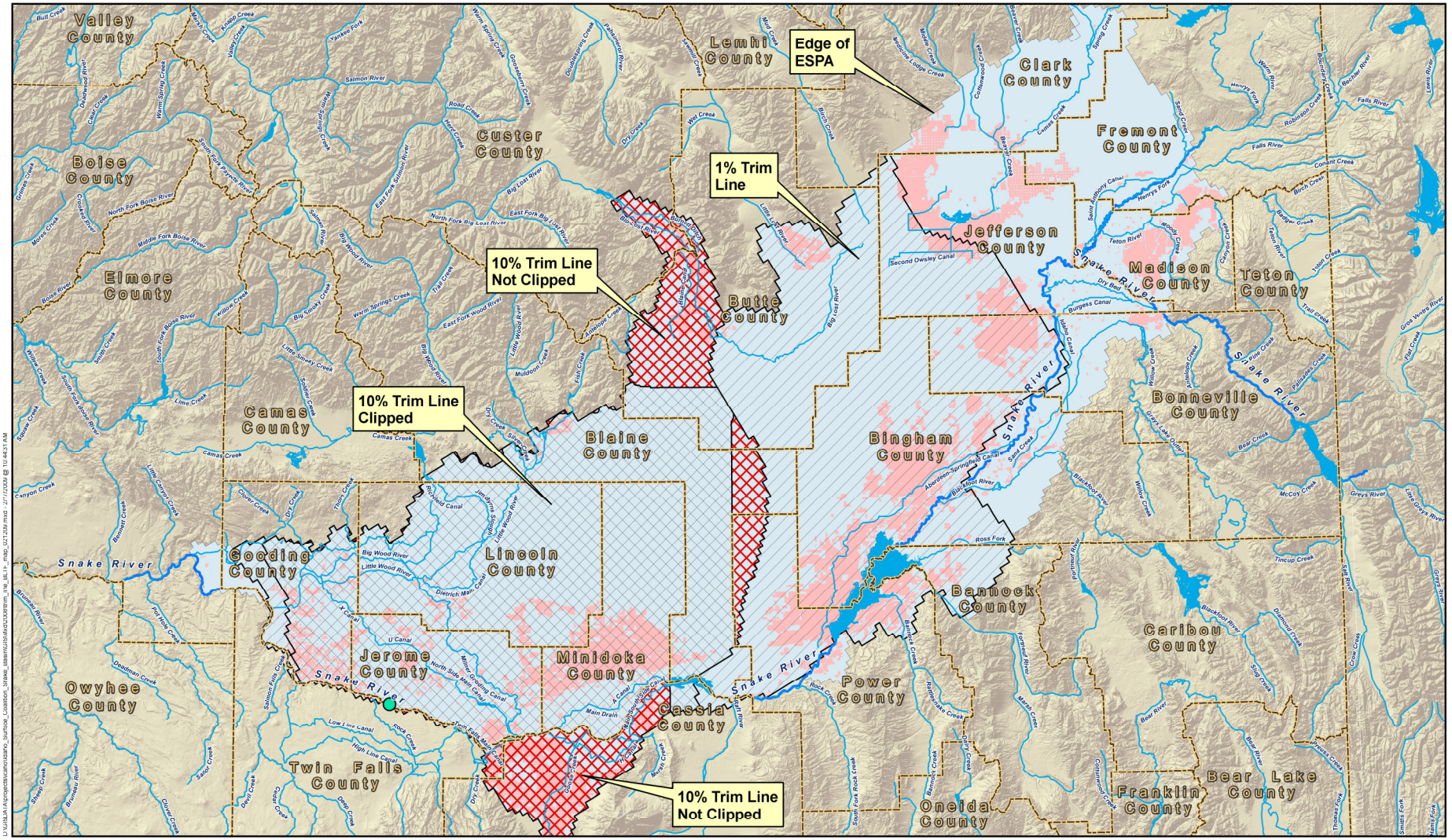


10% trim line identifies about only ½ of the impacts on the spring reach

Location of Devils Washbowl-Buhl Reach "Trim Line"



Aquifer Area Using
Buhl-Thousand Spring Reach "Trim Line"

	Groundwater Irrigated Area (acres)	# of Model Cells	Groundwater Withdrawal (ac-ft)
November 17, 1971 Priority			
All Rights Junior to 1971	361,600	3603	721,818
1% trim	260,955	2661	547,933
10% trim, with out clip to WD130	116,711	1473	261,562
10% trim, clipped to WD130 (IDWR trim line)	74,936	1068	173,241

Results Using
Buhl-Thousand Springs Reach "Trim Line"

Scenario	Devils Washbowl to Buhl Reach Gain (cfs)	Director's Order (20%)
All Rights Junior to 11/17/1971 Priority	96.28	19.26
11/17/1971 priority, 1% trim line	95.46	19.09
11/17/1971 priority, 10% trim line clipped to WD130 (IDWR trim line)	62.96	12.59

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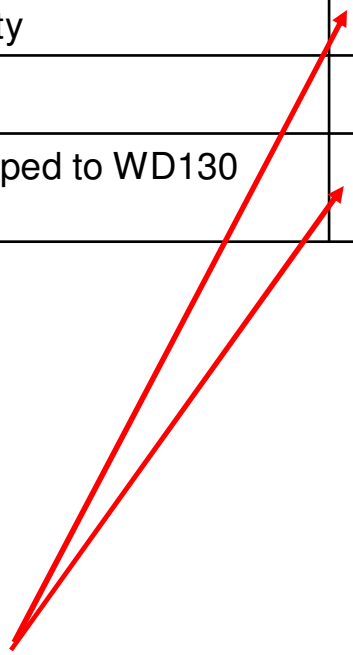

10% trim line identifies about only ½ of the impacts on the spring reach

If we are going to use a “trim line”, what should it accomplish?

- The goal of a trim line should be identification of wells that collectively have a *de-minimus* impact on a spring flow reach.
- *De-minimus*: “Not significant, below a level of meaningful amount.”
- The 10 percent trim line only identifies about ½ of the wells causing the total impact to the spring reach. One-half is obviously significant, and not de-minimus.
- A better trim line can be developed that accomplishes identifying the wells that have a *de-minimus* impact.

Conclusions

- No technical basis to clip the “trim line” to the WD 130 boundary.
- Many model calibration targets (gw levels, spring flow measurements) are more accurate than 10 percent.
- No reasonable justification to use model uncertainty as basis for “trim line”.
- If model uncertainty is to be considered- it should be done calculating the impacts of individual wells on individual springs- not using a “trim line”.

Conclusions

- The “trim line” essentially is a determination of a de-minimus impact. If a “trim line” is to be used, the basis for selection should be to identify those wells that impact the senior’s supply above a *de-minimus* impact.
- Selection of a “trim line” that reduces the senior’s supply by ½ obviously does not identify the wells causing more than a *de-minimus* impact.
- More work should be done to identify a “trim line” that identifies the junior pumping impacting the senior’s supply. There are better options than a 10% trim line.